1. (Once Amended) A method for forming an oxide region on a substrate assembly, the method comprising:

bombarding [a] an exposed predetermined [selected] region of a volume of semiconductor material [substantially] composed of a first material with ions of said first material, said volume of semiconductor material [substantially] composed of said first material being situated on a substrate assembly; and

oxidizing said first material in said exposed predetermined [selected] region.

2. (Once Amended) A method as recited in Claim 1, wherein ions of a type other than said ions of said first material are bombarded into said exposed predetermined region of said volume of semiconductor material [bombarding a selected region of a volume of semiconductor material substantially composed of a first material with ions of said first material leaves unaltered the electrical charge characteristics of the first material within the selected region].

3. (Once Amended) A method as recited in Claim 2, wherein the implanted ions of said first material comprise silicon ions.

4. (Once Amended) A method as recited in Claim 3, wherein said first material is [substantially] composed of monocrystalline silicon.

5. (Once Amended) A method as recited in Claim 1, further comprising:

forming a hard mask on a top surface of the volume of semiconductor material prior to said bombarding an exposed predetermined [selected] region of a volume of semiconductor material [substantially] composed of a first material with ions of said first material; and

subsequently forming an opening in the hard mask to expose the predetermined [selected] region, the ions of said first material being implanted through the opening in the hard mask into the exposed predetermined [selected] region.

6. (Once Amended) A method as recited in Claim 5, further comprising forming a spacer around the opening of the hard mask, said spacer extending from the volume of semiconductor material [substantially] composed of the first material to make contact with the hard mask, wherein said bombarding an exposed predetermined [selected] region of a volume of semiconductor material [substantially] composed of a first material with ions of said first material implants said ions of said first material immediately adjacent to but not through the spacer around the opening in the hard mask.

7. (Once Amended) A method as recited in Claim 6, wherein said forming a spacer around the opening of the hard mask further comprises:

depositing a layer of spacer material over the opening in the hard mask; and

[anisotropically] etching the layer of spacer material over the opening in the hard mask to form the spacer around the opening in the hard mask.

8. (Once Amended) A method as recited in Claim 7, wherein the layer of spacer material comprises [is composed of] silicon nitride.

9. (Once Amended) A method as recited in Claim 7, wherein said etching the layer of spacer material is an anisotropic etch, and wherein the spacer is one of a pair of spacers through which the ions of said first material are implanted between but not through the pair of spacers around the opening in the hard mask and into the exposed predetermined [selected] region, wherein the exposed predetermined [selected] region is situated between the pair of spacers.

10. (Once Amended) A method as recited in Claim 9, wherein the pair of spacers are separated by a minimum distance in the range from about 0.05 micrometers to about 0.1 micrometers.

11. (Once Amended) A method as recited in Claim 1, further comprising the steps, prior to said bombarding an exposed predetermined [selected] region of a volume of semiconductor material [substantially] composed of a first material with ions of said first material, of:

forming a pad oxide layer over the volume of semiconductor material [substantially] composed of the first material;

forming a nitride layer over the pad oxide layer;

forming a photoresist mask over the nitride layer; and

selectively removing the nitride layer through the photoresist mask to expose an opening to the volume of semiconductor material [substantially] composed of the first material at the predetermined [selected] region, wherein the first material is oxidized in the predetermined [selected] region within the opening to the volume of semiconductor material [substantially] composed of the first material.

12. (Once Amended) A method as recited in Claim 11, wherein the photoresist mask is removed after said bombarding an exposed predetermined [selected] region of a volume of semiconductor material [substantially] composed of a first material with ions of said first material.

13. (Once Amended) A method as recited in Claim 11, wherein said selectively removing the nitride layer through the photoresist mask includes selectively removing the nitride layer [through] and selectively removing the pad oxide layer.

14. (Once Amended) A method as recited in Claim 1, wherein the exposed predetermined region of a volume of semiconductor material has a top surface, and [the substrate assembly is oriented in a major plane and] the ions of said first material are implanted into the exposed predetermined [selected] region in a direction that is within ten degrees from a direction that is orthogonal to the top surface [major plane of the substrate assembly].

15. (Once Amended) A method as recited in Claim 1, wherein said oxidizing said first material in said exposed predetermined [selected] region further comprises heating the substrate assembly while exposing the substrate assembly to oxygen.

16. (Once Amended) A method as recited in Claim 1, wherein the volume of semiconductor material [substantially] composed of said first material comprises [is composed of] a monocrystalline material having a lattice structure, wherein the implanted ions of said first material in the monocrystalline material cause the lattice structure of the monocrystalline material to become partially randomized at the predetermined [selected] region into which the ions of said first material are implanted.

17. (Once Amended) A method as recited in Claim 16, wherein both the monocrystalline material and the ions of said first material comprise [are substantially composed of] silicon.

18. (Once Amended) A method as recited in Claim 1, wherein said oxidizing said first material in said exposed predetermined [selected] region is conducted at a pressure in the range of about 1 to 25 atmospheres.

19. (Once Amended) A method as recited in Claim 1, wherein oxidizing said first material in said exposed predetermined [selected] region is conducted at a pressure in the range of about 5 to 25 atmospheres.

20. (Once Amended) A method for forming an oxide region on a substrate assembly, the method comprising the steps of:

forming a hard mask over a volume of silicon of a substrate assembly;

forming an opening in the hard mask to expose a predetermined [selected] region of the volume of silicon;

bombarding the exposed predetermined [selected] region of the volume of silicon with silicon ions through the opening in the hard mask so as to leave unaltered the conductivity type [electrical charge characteristics] of the exposed predetermined [selected] region of the volume of silicon; and

oxidizing the volume of silicon to form silicon dioxide substantially only at the predetermined [selected] region by exposure of the exposed predetermined [selected] region to oxygen.

21. (Once Amended) A method as recited in Claim 20, further comprising forming a spacer around the opening in the hard mask, said spacer extending from the volume of silicon to contact the hard mask, wherein said bombarding the exposed predetermined [selected] region of the volume of silicon with silicon ions through the opening in the hard mask implants ions immediately adjacent to but not through the spacer around the opening in the hard mask.

22. (Once Amended) A method as recited in Claim 21, wherein said forming a spacer around the opening in the hard mask comprises:

depositing layer of spacer material over the opening in the hard mask; and

anisotropically etching the layer of spacer material at the opening in the hard mask to form the spacer situated around the opening of the hard mask.

23. (Once Amended) A method as recited in Claim 21, wherein the spacer around the opening in the hard mask comprises [is composed of] silicon nitride.

24. (Once Amended) A method as recited in Claim 21, wherein the spacer is one of a pair of spacers, the ions being implanted in between but not through the pair of spacers and past the hard mask into the exposed predetermined [selected] region of the volume of silicon, and wherein the exposed predetermined [selected] region is situated between the pair of spacers, whereby the silicon dioxide is not substantially formed underneath the pair of spacers.

25. (Once Amended) A method as recited in Claim 24, wherein the pair of spacers are separated by a minimum distance in the range of about 0.05 micrometers to about 0.1 micrometers.

26. (Once Amended) A method as recited in Claim 20, further comprising forming a pad oxide layer upon the volume of silicon prior to forming a hard mask over a volume of silicon of a substrate assembly, the hard mask being formed upon the pad oxide layer, and said forming a hard mask over a volume of silicon of a substrate assembly comprising:

forming the hard mask upon the pad oxide layer; and

forming a photoresist mask over the hard mask; and wherein silicon dioxide is formed in the volume of silicon at the predetermined [selected] region beneath the opening in the hard mask.

27. (Once Amended) A method as recited in Claim 26, wherein the photoresist mask is removed after said bombarding the exposed predetermined region of the volume of silicon [the step of implanting ions].

28. (Once Amended) A method as recited in Claim 26, wherein said etching the hard mask also etches through the pad oxide layer.

29. (Once Amended) A method as recited in Claim 20, wherein the exposed predetermined region of a volume of silicon has a top surface, and [the substrate assembly is oriented within a major plane and wherein] said bombarding the exposed predetermined [selected] region of the volume of silicon with silicon ions through the opening in the hard mask is conducted such that the direction that the ions are implanted into the exposed predetermined [selected] region is within ten degrees from a direction that is [substantially] orthogonal to the top surface [major plane of the substrate assembly].

30. (Once Amended) A method as recited in Claim 20, wherein said oxidizing the volume of silicon to form silicon dioxide substantially only at the exposed predetermined [selected] region by exposure of the exposed predetermined [selected] region to oxygen further comprises heating the substrate assembly while exposing the substrate assembly to oxygen.

31. (Once Amended) A method as recited in Claim 20, wherein the volume of silicon comprises [is substantially composed of] monocrystalline silicon having a lattice structure, and wherein the implanted silicon ions in the monocrystalline silicon cause the lattice structure of the monocrystalline silicon to become partially randomized at the exposed predetermined [selected] region into which the ions are implanted.

32. (Once Amended) A method for forming an oxide region on a substrate assembly, the method comprising the steps of:

forming a hard mask over a pad oxide layer situated on a volume of silicon of a substrate assembly, the substrate assembly having a top surface [being oriented within a major plane];

forming an opening in the hard mask to expose a predetermined [selected] region of the volume of silicon, said predetermined [selected] region of said volume of silicon comprises [being substantially composed of] monocrystalline silicon having a lattice structure;

depositing layer of silicon nitride over the opening of the hard mask;

[anisotropically] etching the layer of silicon nitride and the pad oxide layer [hard mask at the opening in the hard mask] to form a pair of silicon nitride spacers situated on opposite sides of the opening of the hard mask and having said exposed predetermined region of the volume of silicon therebetween, each said silicon nitride spacer extending from the volume of silicon to contact the hard mask;

implanting silicon ions between but not through the pair of silicon nitride spacers and through the opening in the hard mask into the exposed predetermined [selected] region of the volume of silicon such that the direction that the silicon ions are implanted into the exposed predetermined [selected] region is within ten degrees of a direction that is [substantially] orthogonal to the top surface [major plane] of the substrate assembly, wherein the implanted silicon ions do not substantially alter the conductivity type [electrical charge characteristic] of the predetermined [selected] region, and wherein the implanted silicon ions in the monocrystalline silicon in the

exposed predetermined [selected] region cause the lattice structure thereof to become partially randomized; and

heating the substrate assembly while exposing the substrate assembly to oxygen so as to form silicon dioxide at the exposed predetermined [selected] region, whereby the silicon layer oxidizes faster where the silicon ions are implanted than where the silicon ions are not implanted.

33. (Once Amended) A method as recited in Claim 32, wherein the pair of spacers are separated by a minimum distance in the range of about 0.05 micrometers to about 0.1 micrometers.

The Office Action mailed October 8, 1997 stated that Claims 1-4 and 14-19 are generic. As Applicants have demonstrated above the allowability of these generic claims over the art of record, Applicants also respectfully assert that Applicants are entitled to consideration of claims to additional species, and particularly unelected Claims Once 34-42 and new Claims, as amended and set forth below:

34. (Once Amended) A method for forming a trench isolation region on a substrate assembly, the method comprising:

forming a trench in a volume of semiconductor material comprising [substantially composed of] a first material, said trench having an exposed surface therein, said volume of semiconductor material having a top surface and being situated within a substrate assembly;

implanting ions of said first material into [a] said exposed surface of said trench;

oxidizing the exposed surface of the trench by exposure thereof to oxygen to form a thermal oxide layer comprising [substantially composed of] an oxide of said first material; and

filling [the remainder of] the trench with an insulating material.

35. (Once Amended) A method as recited in Claim 34, wherein the implanted ions of said first material comprise silicon ions.

36. (Once Amended) A method as recited in Claim 35, wherein the first material comprises [is substantially composed of] monocrystalline silicon.

37. (Once Amended) A method as recited in Claim 34, wherein [the substrate assembly is oriented within a major plane and] said implanting ions of said first material is conducted such that the direction that the ions are implanted into the exposed predetermined [selected] region is within ten degrees from a direction that is orthogonal to the top surface of said volume of semiconductor material [major plane of the substrate assembly].

38. (Once Amended) A method as recited in Claim 34, wherein said forming a trench in a volume of semiconductor material comprising [substantially composed of] a first material is conducted as a single etching process that etches adjacent and [substantially] contiguous nitride, oxide, and silicon layers.

39. (Once Amended) A method as recited in Claim 34, wherein said oxidizing the surface of the trench is conducted at a pressure in the range of about 5 to 25 atmospheres.

40. (Once Amended) A method as recited in Claim 34, wherein said forming a trench in a volume of semiconductor material comprising [substantially composed of] a first material comprises:

forming a thin oxide layer on the in a volume of semiconductor material within the substrate assembly;

forming a layer of silicon nitride over the thin oxide layer;

forming a photoresist mask over the layer of silicon nitride; and

conducting a single etching process employing multiple etch recipes to etch the silicon nitride layer, the thin oxide layer, and the silicon substrate to form the trench.

41. (Once Amended) A method for forming a shallow trench isolation region on a substrate assembly, the method comprising:

forming a trench in a volume of monocrystalline silicon within a substrate assembly, said trench having an exposed surface therein;

implanting silicon ions into the exposed [a] surface of the trench;

oxidizing the exposed surface of the trench by exposure [of the trench] to oxygen so as to form silicon dioxide on the exposed surface of the trench; and

filling the trench with silicon dioxide.

42. (Once Amended) A method for forming a shallow trench isolation region on a substrate assembly, the method comprising:

forming a thin oxide layer on a volume of silicon of a substrate assembly, the volume of silicon having a top surface;

forming a layer of silicon nitride over the thin oxide layer;

forming a patterned photoresist mask over the layer of silicon nitride;

conducting an etching process that employs multiple etch recipes to etch the adjacent silicon nitride layer, the thin oxide layer, and the volume of silicon to form a trench in the volume of silicon, said trench having an exposed surface therein;

implanting silicon ions into the exposed surface in the trench, the silicon ions being implanted in a direction that is within ten degrees from a direction that is orthogonal to the top surface of the volume of silicon [a plane of the substrate assembly];

oxidizing the exposed surface of the trench by exposure [exposing thereof] to oxygen at a pressure in the range of about 5 to 10 atmospheres so as to form a thermal oxide layer in the trench;

filling [the remainder of the] trench with silicon dioxide; and

removing the silicon nitride layer.

Add new Claims 43-44 as follows:

43. (New) The method as defined in Claim 1, further comprising, prior to said bombarding an exposed predetermined region of a volume of semiconductor material:

forming a trench in said volume of semiconductor material, said trench having an exposed surface therein, said volume of semiconductor material having a top surface and being situated within a substrate assembly, wherein:

said exposed predetermined region of said volume of semiconductor material is the said exposed surface of said trench;

said oxidizing said first material in said exposed predetermined region comprises oxidizing the exposed surface of the trench by exposure thereof to oxygen to form a thermal oxide layer comprising an oxide of said first material; and

the method further comprising filling the trench with an insulating material.

44. (New) The method as defined in Claim 20, where said forming an opening in the hard mask to expose a predetermined region of the volume of silicon further comprises:

forming a trench in said volume of silicon, said trench having an exposed surface therein, said volume of silicon having a top surface and being situated within a substrate assembly, wherein:

said exposed predetermined region of said volume of silicon is the exposed surface of said trench;

said oxidizing the volume of silicon to form silicon dioxide substantially only at the predetermined region comprises oxidizing the exposed surface of the trench by exposure thereof to oxygen; and

the method further comprising filling the trench with an electrically insulative material.